IS 12464 (1988): Methods of test for roof bars used in mines [MED 8: Mining Techniques and Equipment]

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UDC 622·284·5 : 669·14-422 : 620·1

(Reaffirmed 1999)

Indian Standard

METHODS OF TEST FOR ROOF BARS USED IN MINES

Mining Face Equipment Sectional Committee, EDC 92; Roof Supports Subcommittee, EDC 92 : 3 (EDC 50 : 8) [Ref : Doc : EDC 92/50 (4853)]

1. Scope — Covers the methods of tests for roof bars (both link bars and uncoupled bars) used in mines.

1.1 Tests in addition to those given in this standard may be carried out as agreed to between the manufacturer and the purchaser, or as required by the statutory authority.

2. Information to be Supplied by the Manufacturer — The manufacturer shall provide the information regarding classification, type, other details for identification and overall dimensioned drawing of the bars supplied.

3. Tests and Test Methods

3.1 *Bend Test on Bar Section* — The roof bar shall be simply supported at two points with a specified span and loaded centrally through a standard crown of a prop. The bar shall be loaded gradually up to a specified load corresponding to the bending moment of the bar. With this load acting, the deflection of the bat at the centre, that, is at the point of application of the load, shall be measured and recorded.

3.2 *Bend Test on Joint* — The bars shall be linked togther and set in line by inserting the pin and wedge or by means of pin and shackle. The bars shall then be simply supported over a specified span. With hinge pin positioned at mid-span, two equal loads of a specified magnitude shall be applied gradually. With the specified loads acting on the bars, the deflection of the bars at the hinge pin shall be measured and recorded.

3.3 *Reverse Bend Test on Bar Section* — The roof bar shall be centrally loaded through a standard crown of a prop. The bar shall be gradually loaded until the central deflection is of a specified value or until the load reaches a specified value whichever occurs first. The bar shall then be turned over and loaded again until the central deflection is of the specified value in the opposite direction or until the load reaches a specified value whichever occurs first. This cycle shall be repeated for a specified number of times.

3.4 *Crushing Test*

3.4.1 The roof bar shall be placed on a flat surface with a minimum specified length, and a specified load shall be applied centrally with respect to the support length and gradually perpendicular to the flange of the bar through a standard crown of a prop at the point of support for props. After this test, the bar shall be checked for any permanent deformation.

3.4.2 The bar shall be tested as in **3.4.1** except that the crown shall be inclined laterally at an angle of 10° to the normal. The bar shall be checked to see whether it withstands a specified crushing load at the point of support for props.

3.5 *Destruction Test on Bar Section* — The roof bar simply supported shall be centrally loaded through a standard crown of a prop. The load shall be gradually increased till the failure of the bar section occurs. The maximum bending moment of the bar section at failure shall be determined. The deflections of the bar at the centre of the span at different loads (in steps of 10 kN or 1 tonne after nominal bending moment) shall also be noted.

3.6 *Destruction Test on Joint* — Two roof bars shall be linked together and loaded. The equal loads shall be increased gradually until the joint (or bar) failure occurs. The maximum bending moment of the joint at failure shall be determined. The deflections at the hinge pin with different loads shall also be noted.

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3.7 *Cantilever Test* — The fixed bar of a two bar cantilever shall be mounted between a standard crown of a prop and a flat steel plate so that the centre of the crown coincides with the quarter bar position nearer the fork end. An end load of specified magnitude is gradually applied and deflection is measured. As a cantilever, the bar shall sustain a minimum specified load before deflecting a specified value measured at the end of the bar. For uncoupled bars, load shall be applied at or near the end remote from the prop. The distance between the point of load application and the nearest edge of the prop head shall be of a specified value.

3.8 *Flaw Sensitivity Test* — A saw cut shall be made transversely accross the flange of the bar section at the centre of the test span with a previously unused sharp blade having 710 teeth per metre rate. The saw cut shall be 2 mm deep for sections up to 88 mm total depth and 3 mm deep for sections over 88 mm total depth. A bend test shall be made over a span of 700 mm with the saw cut on the tension side and with single point central loading on the opposite face using the standard prop cap or with a knife edge to the full bar width. The load shall be applied at such a rate that the deflection at the bar centre, after the yield occurs, takes place at approximately 10 mm per minute. The test shall be carried out at a temperature of $300 \pm 2°$ K. Bending shall continue until the fracture occurs. If the fracture does not take place on the first bend, to the limits of the deflection which can be applied, the bar shall be straightened, the depth of saw cut increased by 1 mm and the test repeated.

3.9 *Mode of Failure* — Mode of failure of the bar, if any, in any of the tests in **3.1** to **3.8** shall be ductile rather than brittle and shall not be in an abrupt manner.

EXPLANATORY NOTE

This Indian Standard is a necessary adjunct to IS : 8473-1988 'Specification for roof bars used in mines (*first revision*)'.

In the preparation of this standard, assistance has been derived from the following:

DIN 21550-1969 Prufung von Strebkappen für den Grubenausbau (Testing of strut sole pieces for support in mines), Deutsches Institut für Normung (DIN).

JIS 2503-1967 Link bar. Japanese Industrial Standards Association.

Standard testing procedure No. 1 — Roof bars. National Coal Board, UK.

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